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04/14/2004

John Philip MacCormick

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WOODCOCK WASHBURN LLP (MICROSOFT CORPORATION)

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EXAMINER

MYINT, DENNIS Y

ART UNIT

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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/823,870	Applicant(s) MACCORMICK, JOHN PHILIP	
	Examiner Dennis Myint	Art Unit 2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>04/14/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

Art Unit: 2162

DETAILED ACTION

1. Claims 1-26 have been examined.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. Claims 1-8, 25-29, and 31-39 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

MPEP 2106 (IV)(C)(2)((B))((2))(a) and (b) states that :

For an invention to be "useful" it must satisfy the utility requirement of section 101. The USPTO's official interpretation of the utility requirement provides that the utility of an invention has to be (i) specific, (ii) substantial and (iii) credible. MPEP § 2107 and Fisher, 421 F.3d at 1372, 76 USPQ2d at 1230 (citing the Utility Guidelines with approval for interpretation of "specific" and "substantial"). In addition, when the examiner has reason to believe that the claim is not for a practical application that produces a useful result, the claim should be rejected, thus requiring the applicant to distinguish the claim from the three 35 U.S.C. 101 judicial exceptions to patentable subject matter by specifically reciting in the claim the practical application. In such cases, statements in the specification describing a practical application may not be sufficient to satisfy the requirements for section 101 with respect to the claimed invention. Likewise, a claim that can be read so broadly as to include statutory and nonstatutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected.

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result.

As such, Claims 1, 9, 17, and 22 are directed to non-statutory because the

Art Unit: 2162

claims do not *produce a useful, concrete and tangible result*.

Claims 2-8 are rejected under U.S.C. 101 because of its dependency on claim 1.

Claims 10-16 are rejected under U.S.C. 101 because of its dependency on claim 9.

Claims 18-21 are rejected under U.S.C. 101 because of its dependency on claim 17.

Claims 23-26 are rejected under U.S.C. 101 because of its dependency on claim 22.

Response to Arguments

4. Applicant's arguments filed on 09 January 2007 have been fully considered but they are not persuasive.

Referring to claims 1, 7, 9 and 15 Applicant argued that Reiter dose not address renaming elements of a directory represented in as a B-tree, as restricted by Applicant's amended claims (Applicant's argument, Page 7, Last Paragraph). In response, it is pointed out that claims 1, 7, 9, and 15 do not recite the limitation "a directory" and, as such, Applicant's argument is moot and invalid.

Additionally, Applicant argued that *One of skill in the art would not be motivated to look to this area of the art for solutions to problems that may arise when renaming elements of a file system represented by a B-tree* (Applicant's argument, Page 8 Lines 5-7). In response to applicant's argument that there is no

Art Unit: 2162

suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837

F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, one would have been motivated to do so in order to *enable a database management system to maintain more compact indexes while providing performance equivalent to existing indexing schemes* (Bumbulis, Paragraph 0022).

Applicant also argued that even if properly combined, Bumbulis does not disclose or suggest renaming elements of a directory as recited by Applicant's amended claims (Applicant's argument, Page 8 Lines 6-8). In response, it is pointed out that claims 1, 7, 9, and 15 do not recite the limitation "a directory" and, as such, Applicant's argument is moot and invalid.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 7, 9, 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiter et al., (hereinafter "Reiter") (U.S. Patent Number 5752243) in view of Bumbulis (hereinafter "Bumbulis") (U.S. Patent Application Publication Number 2003/0204513).

As per claim 1, Reiter is directed to a method of changing values of a range of consecutive keys in an original B-tree having a plurality of keys stored therein (Figure 8; Column 10 Lines 36-40, i.e., *horizontal splitting*; and Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*), comprising:

"excising the range of consecutive keys from the original B-tree, the original B-tree representing a file system, wherein renaming an element of the file system requires the changing of the values of the range of consecutive keys, the excision of the range of consecutive keys converting the original B-tree into a trimmed tree" (Figure 8; Column 10 Lines 36-40, i.e., *horizontal splitting*; and

Art Unit: 2162

Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*; and Reiter, Column 9 Lines 32-43, i.e., *key value and pointer*; and Rao, Column 11 Lines 52-67, i.e., *by means of a pathname of the directory*); Note that horizontal splitting would excise a range of consecutive keys from a original B-tree and would convert the original B-tree into a trimmed tree;

"storing the range of consecutive keys excised from the B-tree to form an extracted tree" (Column 9 Lines 32-43, i.e., *the tree manager moves a subset of the page's node entries to a new adjacent page*); and

"changing the values of the keys of the extracted tree to form a modified extracted tree" (Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*).

Reiter does not explicitly teach the limitation: "inserting the modified extracted tree into the trimmed tree to form a final B-tree".

On the other hand, Bumbulis teaches the limitation: "inserting the modified extracted tree into the trimmed tree to form a final B-tree" (Paragraph 0115, i.e., *The merge operation is the inverse of the split operation*; Paragraph 0151; Paragraph 0155, i.e., *A merge starts by copying the nodes for the left and right trees into consecutive locations*).

Art Unit: 2162

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to combine the method of Reiter, which performs horizontal splitting and renaming of nodes of a subtree that was split, with the method of Bumbulis, which merges back the split trees, so that the combined method would excise a range of consecutive keys from an original B-tree, converting the original B-tree into a trimmed tree; store the range of consecutive keys excised from the B-tree to form an extracted tree; change the values of the keys of the extracted tree to form a modified extracted tree; and insert the modified extracted tree into the trimmed tree to form a final B-tree. One would have been motivated to do so in order to *enable a database management system to maintain more compact indexes while providing performance equivalent to existing indexing schemes* (Bumbulis, Paragraph 0022).

As per claim 7, Bumbulis in view of Reiter teaches the limitation:

" wherein the step of changing includes changing a prefix field of a root node" (Bumbulis, Figures 7E and 7E and Paragraph 0198, i.e., *Fig. 7D illustrates a ptree 730 after insertion of a node y having a key value key (y) = prefix (c) 0 into the ptree 710 of Fig 7A*) "of the extracted tree" (Reiter, Figure 8; Column 10 Lines 36-40, i.e., *horizontal splitting*; and Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*).

Art Unit: 2162

Claim 9 is rejected on the same basis as claim 1.

Claim 15 is rejected on the same basis claim 7.

7. Claims 2-4, 10-12, 17, 18, 21, 22, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiter in view of Bumbulis and further in view of Rao et al., (hereinafter "Rao") (U.S. Patent Number 5689706).

As per claim 2, Reiter in view of Bumbulis does not explicitly teach the limitation: "wherein the original B-tree represents a hierarchical namespace".

Rao teaches the limitation: "wherein the original B-tree represents a hierarchical namespace"(Column 7 Lines 49-59, i.e., ***name space 405; the delete function checks whether information about the deleted file needs to be removed from frond end replicated tree 505; and Column 14 Lines 1-15, i.e., namespace 405; there is also an unmount operation which removes replicated tree entry 1017 having the specified pathname from replicated tree 1015).***

At the time the invention was made, it would have been obvious to a person or ordinary skill in the art to add the feature of having a tree which represents hierarchical namespace, as taught by Rao, to the method of Reiter in view of Bumbulis so that in the resultant method would the original B-tree would represent a hierarchical namespace. One would have been motivated to do so because the use of B-trees representing hierarchical namespace is notoriously well known in the art.

Art Unit: 2162

As per claim 3, Reiter in view of Bumbulis and further in view of Rao teaches the limitations:

“wherein the original B-tree represents a hierarchical namespace of a file system” (Rao, Column 7 Lines 49-59, i.e., ***name space 405***; *the delete function checks whether information about the deleted file needs to be removed from frond end replicated tree 505*; and Column 14 Lines 1-15, i.e., *namespace 405*; *there is also an unmount operation which removes replicated tree entry 1017 having the specified pathname from replicated tree 1015*), and “the range of consecutive keys belong to a directory of the file system, and wherein the changing of the values of the range of consecutive keys is in connection with the directory being renamed” (Reiter, i.e., *A hierarchical data model is one in which units of data are associated in a multidimensional parent-child relationship. In a file system, for example, files and subdirectories descend from a main directory*; and Reiter, Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page’s node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*). In the combined method of Reiter in view of Bumbulis and further in view of Bumbulis, horizontally split nodes would represent directories (Reiter in view of Rao).

As per claim 4, Reiter in view of Rao teaches the limitation:

“wherein each key in the original B-tree contains a pathname for a file or directory of the file system prior to the renaming of the directory” (Reiter, Column

Art Unit: 2162

9 Lines 32-43, i.e., *key value and pointer*; and Rao, Column 11 Lines 52-67, i.e., *by means of a pathname of the directory*).

Claims 10-12 are rejected on the same basis as claims 2-4 respectively.

As per claim 17, Reiter in view of Bumbulis and further in view of Rao is directed to a method of modifying a B-tree, wherein the B-tree represents a file system, wherein renaming an element of the file system requires the changing of the values of the range of consecutive keys (Reiter, Column 9 Lines 32-43, i.e., *key value and pointer*; and Rao, Column 11 Lines 52-67, i.e., *by means of a pathname of the directory*) and teaches the limitations:

“excising keys of the directory being renamed from the B-tree, the excision of the keys of the directory converting the B-tree into a trimmed tree” (Reiter, Figure 8; Column 10 Lines 36-40, i.e., *horizontal splitting*; and Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*; Note that horizontal splitting would excise a range of consecutive keys from a original B-tree and would convert the original B-tree into a trimmed tree; Rao, Column 7 Lines 49-59, i.e., **name space 405**; *the delete function checks whether information about the deleted file needs to be removed from frond end replicated tree 505*; and Column 14 Lines 1-15, i.e., *namespace 405*; *there is also an unmount operation which removes replicated tree entry 1017 having the*

Art Unit: 2162

specified pathname from replicated tree 1015; In the combined method of Reiter in view of Bumbulis and further in view of Bumbulis, horizontally split nodes would represent directories (Reiter in view of Rao);

*“storing the keys of the directory excised from the B-tree in an extracted tree” (Reiter, Column 9 Lines 32-43, i.e., *the tree manager moves a subset of the page’s node entries to a new adjacent page*);*

*“changing the values of the keys of the extracted tree to reflect a new name of the directory” (Reiter, Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page’s node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*; Rao, Column 7 Lines 49-59, i.e., **name space** 405; *the delete function checks whether information about the deleted file needs to be removed from frond end replicated tree 505*; and Column 14 Lines 1-15, i.e., *namespace 405; there is also an unmount operation which removes replicated tree entry 1017 having the specified pathname from replicated tree 1015*; In the combined method of Reiter in view of Bumbulis and further in view of Bumbulis, horizontally split nodes would represent directories (Reiter in view of Rao)); and*

*“inserting the extracted tree with changed values of the keys into the trimmed tree to form a final B-tree” (Bumbulis, Paragraph 0115, i.e., *The merge operation is the inverse of the split operation*; Paragraph 0151; Paragraph 0155, i.e., *A merge starts by copying the nodes for the left and right trees into consecutive locations*).*

At the time the invention was made, one would have been motivated to combine the feature of performing horizontal splitting and renaming of nodes of a subtree that was split, as taught by Reiter, the feature of merging/inserting back split trees, as taught by Bumbulis, and the feature of having a tree which represents hierarchical namespace, as taught by Rao so that the resultant method would teach all the limitations of instant claim 17. One would have been motivated to do so in order to *enable a database management system to maintain more compact indexes while providing performance equivalent to existing indexing schemes* (Bumbulis, Paragraph 0022) and because the use of B-trees representing hierarchical namespace is notoriously well known in the art

Claim 18 is rejected on the same basis of claim 4.

As per claim 21, Bumbulis in view of Reiter teaches the limitation:

“ wherein the step of changing includes changing a prefix field of a root node” (Bumbulis, Figures 7E and 7E and Paragraph 0198, i.e., *Fig. 7D illustrates a ptree 730 after insertion of a node y having a key value key (y) = prefix (c) 0 into the ptree 710 of Fig 7A*) “of the extracted tree” (Reiter, Figure 8; Column 10 Lines 36-40, i.e., *horizontal splitting*; and Column 9 Lines 32-43, i.e., *Generally, to split a page horizontally, the tree manager moves a subset of the page's node entries to a new adjacent page and stores a new key value and a pointer to the new page in the parent page to the page being split*).

Claim 22 is rejected on the same basis as claim 17.

Claim 23 is rejected on the same basis as claim 18.

Claim 26 is rejected on the same basis as claim 21.

8. Claims 5, 6, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiter in view of Bumbulis and further in view of Li et al., (hereinafter "Li") (U.S. Patent Application Publication Number 2002/0198891).

As per claim 5, Reiter in view of Bumbulis does not explicitly teach the limitation: "including the step of balancing the trimmed tree prior to the step of inserting".

Li teaches the limitation:

"including the step of balancing the trimmed tree prior to the step of inserting" (Paragraphs 0117-0118, i.e., *may involve splitting and balancing the tree; may involve merging and balancing the tree*).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of balancing trees prior to merging (inserting) to the method of Reiter in view of Bumbulis so that the resultant would comprise balancing B-trees. One would have been motivated to do so because tree-balancing is notoriously well known in the art.

Claim 6 is rejected on the same basis as claim 5.

Art Unit: 2162

Claims 13 and 14 are rejected on the same basis as claim 5 and 6 respectively.

9. Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiter in view of Bumbulis and further in view of Cheng et al., (hereinafter "Cheng") (U.S. Patent Number 5204958) and further in view of Beyer et al., (hereinafter "Beyer") (U.S. Patent Application Publication Number 2006/0173927).

As per claim 8, Reiter in view of Bumbulis does not explicitly teach the limitation: "wherein the step of inserting the modified extracted tree into the trimmed tree involves a strict insertion".

Cheng teaches the limitation: "inserting the modified extracted tree into the trimmed tree" (Column 11 Lines 33-45, i.e., *could be inserted between the memory resident small B-tree SBT148 and the large B-tree 132*; Note that the disk on which these trees reside itself a large tree) and Beyer teaches the limitation: "strict insertion" (Figure 1 and Paragraph 0022-0024, and particularly Paragraph 0017, i.e., *still maintain these properties*).

At the time the invention was made, it would have been obvious to a person ordinary skill in the art to add the feature of inserting a tree into another tree, as taught by Cheng, and the feature of maintaining key values (i.e. ID values and relationships among nodes), as taught by Beyer, to the method of Reiter in view of Bumbulis so that the resultant method would comprise the step of inserting the modified extracted tree into the trimmed tree involves a strict

Art Unit: 2162

insertion. One would have been motivated to do so in order to *enable a computer system to perform high frequencies inserts into the indexes of large databases* (Cheng, Column 2 Lines 40-45) and to *maintain/retain the order and relationships between the parent, child, sibling nodes* (Beyer, Paragraph 0015).

Claim 16 is rejected on the same basis as claim 8.

10. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiter in view of Bumbulis, further in view of Rao and further in view of Li.

As per claim 19, Reiter in view of Bumbulis and further in view of Rao does not explicitly teach the limitation: "including the step of balancing the trimmed tree prior to the step of inserting".

Li teaches the limitation:

"including the step of balancing the trimmed tree prior to the step of inserting" (Paragraphs 0117-0118, i.e., *may involve splitting and balancing the tree; may involve merging and balancing the tree*).

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to add the feature of balancing trees prior to merging (inserting) to the method of Reiter in view of Bumbulis so that the resultant would comprise balancing B-trees. One would have been motivated to do so because tree balancing is notoriously well known in the art.

Art Unit: 2162

Claim 20 is rejected on the same basis as claim 19.

Claims 24 and 25 are rejected on the same basis as claim 19 and 20 respectively.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure as follows:

Mane et al., (U.S. Patent Application Publication Number 2005/0050107).

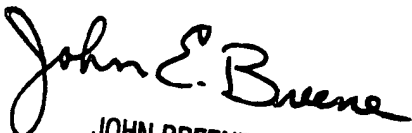
Art Unit: 2162

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dennis Myint whose telephone number is (571) 272-5629. The examiner can normally be reached on 8:30AM-5:30PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-5629.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


JOHN BREENE
SUPERVISORY PATENT EXAMINER
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